

WHAT IS CLAIMED:

- 1 1. A method for supplying an inspired gas to a person, the method
- 2 comprising the steps of: a) determining whether the person is in
- 3 the exhalation or inhalation phase of a respiratory cycle; and b)
- 4 delivering an increased flow of inspired gas to the person during the
- 5 inhalation phase of the respiratory cycle.
- 1 2. The method of claim 1, wherein the inspired gas includes pure
- 2 gas.
- 1 3. The method of claim 2, wherein the pure gas includes oxygen.
- 1 4. The method of claim 1, wherein the inspired gas includes a gas
- 2 mixture.
- 1 5. The method of claim 4, wherein the gas mixture includes a
- 2 mixture of oxygen and air.
- 1 6. The method of claim 4, wherein the gas mixture includes a
- 2 mixture of oxygen and nitrogen.
- 1 7. The method of claim 4, wherein the gas mixture includes a
- 2 mixture of oxygen and water vapor.
- 1 8. The method of claim 4, wherein the gas mixture includes a
- 2 mixture of oxygen and bronchodilators.
- 1 9. The method of claim 4, wherein the gas mixture includes a
- 2 mixture of oxygen and helium.

1 10. The method of claim 1, wherein the inspired gas may be released
2 to the ambient environment.

1 11. The method of claim 1 also comprising the step of determining
2 the primary respiratory site; and sampling the person's breath gas
3 stream at least in accordance with the determination of the primary
4 respiratory site.

1 12. The method of claim 11 whereby the gas stream at the mouth is
2 continuously sampled, in addition to sampling at the determined
3 primary respiratory site.

1 13. The method of claim 11, wherein the step of sampling the breath
2 gas stream includes the step of monitoring the ventilation of the
3 person at least in accordance with the determination of the person's
4 primary respiratory site.

1 14. The method of claim 13 whereby the gas stream at the mouth is
2 continuously sampled, in addition to sampling at the determined
3 primary ventilatory site.

1 15. The method of claim 1 wherein the inspired gas is delivered to
2 the person in the area of the person's nose and mouth.

1 16. The method of claim 1, wherein the inspired gas is delivered to
2 the person in the area in front of the person's mouth.

- 1 17. The method of claim 1 wherein the determining of whether the
- 2 person is in the exhalation or inhalation phase is accomplished by
- 3 analyzing the pressure in the person's breath gas stream.
- 1 18. The method of claim 17 also comprising the step of monitoring
- 2 the respiratory rate in accord with the pressure analysis.
- 1 19. The method of claim 17 also comprising the step of monitoring
- 2 the inspiratory/expiratory time ratio in accord with the pressure
- 3 analysis.
- 1 20. The method of claim 17, wherein the pressure in the person's
- 2 breath gas stream is determined by sampling pressure at at least
- 3 one respiratory site.
- 1 21. The method of claim 17, wherein the determining of whether the
- 2 person is in the exhalation or inhalation phase is accomplished by
- 3 analyzing the humidity in the person's breath gas stream.
- 1 22. The method of claim 21 also comprising the step of monitoring
- 2 the respiratory rate in accord with the humidity analysis.
- 1 23. The method of claim 21 also comprising the step of monitoring
- 2 the inspiratory/expiratory time ratio in accord with the humidity
- 3 analysis.
- 1 24. The method of claim 17, wherein the determining of whether the
- 2 person is in the exhalation or inhalation phase is accomplished by
- 3 analyzing the temperature in the person's breath gas stream.

- 1 25. The method of claim 24 also comprising the step of monitoring
- 2 the respiratory rate in accord with the temperature analysis.
- 1 26. The method of claim 24 also comprising the step of monitoring
- 2 the inspiratory/expiratory time ratio in accord with the temperature
- 3 analysis.
- 1 27. The method of claim 11, wherein the determining of the primary
- 2 respiratory site is accomplished by sampling pressure at the
- 3 respiratory sites and comparing said pressures.
- 1 28. The method of claim 11, wherein the step of sampling the
- 2 exhaled gas stream includes sampling the level of CO₂ in the
- 3 person's breath gas stream.
- 1 29. The method of claim 13, wherein the monitoring of the
- 2 ventilation is accomplished by measuring the CO₂ levels in the
- 3 person's breath stream.
- 1 30. The method of claim 29, wherein the monitoring of the
- 2 ventilation is accomplished by measuring the end-tidal CO₂ value.
- 1 31. The method of claim 29, wherein the monitoring of the
- 2 ventilation is accomplished by determining the area under the
- 3 expired CO₂ time pilot.
- 1 32. The method of claim 1 also comprising the step of delivering a
- 2 decreased flow of inspired gas to the patient during exhalation.

1 33. The method of claim 11, wherein the step of sampling the breath
2 gas stream includes monitoring the level of a drug in the person's
3 breath gas stream.

1 34. The method of claim 33, wherein the drug is an intravenous
2 anesthetic.

1 35. The method of claim 33 wherein the drug is propofol.

1 36. The method of claim 11, wherein the sampled gas is xenon.

1 37. An apparatus that delivers inspired gas to a person comprising:
2 a) an inspired gas delivery device; b) at least one respiratory site
3 sampling device which samples the pressure at at least one
4 respiratory site; c) and wherein the respiratory site sampling device
5 is connected to a pressure analyzer which determines the phase of
6 the person's respiration cycle; d) and wherein the inspired gas
7 delivery device is connected to a controller that modulates the flow
8 of inspired gas in accordance with the phase of the person's
9 respiratory cycle.

1 38. The apparatus of claim 37, wherein the respiratory site sampling
2 device comprises at least one nasal sampling device which samples
3 the pressure in the person's nasal airway and an oral sampling
4 device which samples the pressure in the person's oral airway.

- 1 39. The apparatus of claim 37, wherein the controller delivers a
- 2 higher flow of inspired gas during the inhalation phase of the
- 3 person's respiratory cycle.
- 1 40. The apparatus of claim 38, wherein at least two of the nasal and
- 2 oral sampling devices are connected to a pressure comparator which
- 3 determines the person's primary respiratory site.
- 1 41. The apparatus of claim 37 also comprising a gas sampling
- 2 device.
- 1 42. The apparatus of claim 41, wherein the gas sampling device is a
- 2 capnometer.
- 1 43. The apparatus of claim 41, wherein the gas sampling device
- 2 comprises a nasal gas sampling device and an oral gas sampling
- 3 device and wherein the controller selects at least the gas stream
- 4 from the primary respiratory site for monitoring.
- 1 44. The apparatus of claim 43, wherein the oral and nasal gas
- 2 sampling devices are capnometers.
- 1 45. The apparatus of claim 37 also comprising a flow control valve
- 2 and wherein the controller runs software that indicates an error to
- 3 a user if while the flow control valve is open, the controller detects
- 4 pressure at the source of inspired gas but fails to detect pressure
- 5 downstream of the flow control valve.

1 46. The apparatus of claim 37 also comprising an auditory breath
2 sonification device that amplifies breath sounds.

1 47. The apparatus of claim 46, wherein the auditory breath
2 sonification device is a microphone that amplifies actual breath
3 sounds.

1 48. The apparatus of claim 46, wherein the auditory breath
2 sonification device comprises a white noise generator that provides
3 simulated breath sounds.

1 49. The apparatus of claim 48, wherein said simulated breath
2 sounds distinguish between inhalation and exhalation breath
3 sounds.

1 50. The apparatus of claim 41, wherein the gas sampling device
2 samples CO₂ gas.

1 51. The apparatus of claim 41, wherein the gas sampling device
2 samples xenon gas.

1 52. The apparatus of claim 41, wherein the gas sampled is a drug.

1 53. The apparatus of claim 52, wherein the drug is an intravenous
2 anesthetic.

1 54. The apparatus of claim 52, wherein the drug is propofol.

1 55. The apparatus of claim 37, wherein the inspired gas delivery
2 device comprises a diffuser.

- 1 56. The apparatus of claim 37, wherein the controller reduces the
- 2 flow of inspired gas during the exhalation phase.
- 1 57. A method for delivering an inspired gas, the method comprising
- 2 the steps of: a) determining the breath phase; b) delivering a higher
- 3 flow of inspired gas during the inhalation phase; and c) monitoring
- 4 gases in the breath gas stream.
- 1 58. The method of claim 57 also comprising the step of determining
- 2 at least one of the breath rate and inspiratory/expiratory time ratio.
- 1 59. The method of claim 57, wherein the step of determining at least
- 2 one of the breath phase, breath rate and inspiratory/expiratory time
- 3 ratio is accomplished by analyzing the pressure waveform at at
- 4 least one respiratory site.
- 1 60. The method of claim 57, wherein the step of determining at least
- 2 one of the breath phase, breath rate and inspiratory/expiratory time
- 3 ratio is accomplished by monitoring the humidity at at least one
- 4 respiratory site.
- 1 61. The method of claim 57, wherein the step of determining at least
- 2 one of the breath phase, breath rate and inspiratory/expiratory time
- 3 ratio is accomplished by monitoring the temperature at at least one
- 4 respiratory site.
- 1 62. The method of claim 57 also comprising the step of reducing the
- 2 flow of inspired gas during the exhalation phase.

1 63. The method of claim 57, wherein the monitoring of exhaled gas
2 is performed during a period of low gas flow in the exhalation
3 phase.

1 64. The apparatus of claim 37 also comprising a plurality of lumens
2 which effect one or more of delivering of inspired gas, respiratory
3 site sampling and gas sampling and wherein said lumens are
4 affixed to one another along separable tear lines.

1 65. The apparatus of claim 64, wherein the lumen that
2 accommodates the flow of inspired gas is of larger circumference
3 than the other lumens.

1 66. An apparatus according to claim 64 wherein one of said lumens
2 is a stimulus channel that carries an auditory prompt to the person.

1 67. A pneumatic harness for a medical device comprising a plurality
2 of lumens grouped in one or more clusters, said clusters being
3 manually separable from one another.

1 68. The pneumatic harness of claim 67, wherein the harness also
2 comprises tear lines to permit separation of the lumens from one
3 another.

1 69. The pneumatic harness of claim 67, wherein at least one of the
2 lumens is larger than the other lumens.

1 70. The pneumatic harness of claim 67, wherein the cross section of
2 each cluster is of aerofoil shape.

1 71. The pneumatic harness of claim 67 also comprising a connector
2 that permits delivery of supplemental oxygen from standard
3 medical oxygen connectors using an oronasal piece.

1 72. The pneumatic harness of claim 67 also comprising an adapter
2 that connects the pneumatic harness to a medical device.

1 73. A method of determining which of the two nares is less
2 obstructed, said method comprising the steps of: a) sampling the
3 pressure in the gas stream of each nare; b) comparing the pressure
4 variations in the gas stream within each nare; c) comparing the
5 extent of variation of said pressures as between the nares; and d)
6 selecting the nare with the larger pressure variation as the nare
7 that is less obstructed.

1 74. The method of claim 73, wherein the nare that is less obstructed
2 is selected to receive inspired gas.

1 75. The method of claim 73, wherein the nare that is less obstructed
2 is selected for gas sampling.

1 76. The method of claim 73, wherein the nare that is less obstructed
2 is selected for pressure sampling.

1 77. The method of claim 73, wherein the nare that is less obstructed
2 is selected for determination of respiration phase.

1 78. The method of claim 73, wherein the nare that is less obstructed
2 is selected for determination of respiration rate.

1 79. The method of claim 73, wherein the nare that is less obstructed
2 is selected for determination of inhalatory/expiratory time ratio.